Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	**)**	
	)	
Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems	**)**	**ET Docket No. 98-153**

TO: The Commission

KOHLER CO.
PETITION FOR PARTIAL RECONSIDERATION

On May 16, 2002, the Commission released its *Report & Order* in the above-captioned proceeding. 67 Fed. Reg. 34852. In this rule making, the Agency adopted rules to permit the marketing and operation of certain devices incorporating ultra-wideband ("UWB") technology.

Kohler Co. ("Kohler"), a worldwide leader in plumbing and power systems, submitted comments in response to the Agency's *Notice of Proposed Rule Making* in this proceeding. Kohler congratulates the Commission for adopting rules in this controversial proceeding that will permit the operation of certain UWB devices. Kohler also commends the Commission for undertaking to review the UWB rules in the next six to twelve months with the aim of issuing a *Further Notice of Proposed Rule Making* to explore the feasibility of adopting more flexible technical standards and to permit the operation of additional types of UWB devices.

In this Petition for Partial Reconsideration, Kohler requests only that the Commission raise the emission limit for indoor devices operating in the frequency range 960 to 1610 GHz from -75.3 dBm EIRP to -53.3 dBm EIRP. The emission limit currently specified in the Rules is so low that measurements are impractical. Raising the emission limit slightly will not create any interference to Federal systems operating in the band because, given the attenuation provided by buildings, any UWB emissions which are detectable outside buildings will still be below the permissible limits for handheld outdoor devices.

DISCUSSION

The adopted emission limit in the band from 960 to 1610 MHz is 34 dB below the general Part 15 limits, or 0.04% of the allowed emission from other Part 15 devices. Based on the parameters below, which reflect a good measurement system in a high quality test laboratory, the best available noise floor at 960 MHz is -82.3 dBm EIRP and -84 dBm EIRP at 1610 MHz.

Thermal Noise Limit:	-174.0	dBm/Hz
RBW:	1.0	MHz
RBW Filter Shape Factor:	2.0	dB
Preamp Noise Figure:	5.0	dB
Cable Loss:	2.2	dB
Antenna Size:	25.0	cm [EMCO 3115 horn]
Antenna Factor (960):	23.1	dB [EMCO 3115 horn]
Antenna Factor (1610):	25.9	dB [EMCO 3115 horn]
Rayleigh Distance (960):	93.8	cm
Rayleigh Distance (1610):	55.9	cm

The figures above are appropriate for a good measurement system and do not assume a particular analyzer type, only that a preamp with a 5 dB noise figure is used (the best that normally is used in a compliance test lab). This system would provide an easily adequate noise floor for any other compliance measurement, but does not provide a sufficiently low noise floor to make an accurate measurement against the UWB standards for the frequency range 960 to 1610 MHz. This is because the FCC requires the noise floor to be at least 10 dB below the specified limit of -75 dBm EIRP.

Kohler has attempted to make the required measurement, at Compliance Certification Services, an FCC-certified test facility in Morgan Hill, CA. Using an Agilent 8563E spectrum analyzer, a Miteq NSP10023988 preamp connected to an EMCO 3115 double-ridged waveguide horn antenna with a 12" cable, the best measurement equipment currently available at accredited test labs, we confirmed that we are unable to attain the required sensitivity. Using this equipment, the highest sensitivity that could be obtained at the edge of the specified band is barely 7 dB below the specification, not the 10 dB required to obtain accurate amplitude measurements. This creates an anomalous situation where emissions from devices which comply with the standard cannot be accurately measured in this frequency range because they are too close to the best obtainable noise floor. In addition, if any emission is evident, it must be accurately measured to be below the specified limit by a margin sufficient to allow for site calibration errors, production variations, *etc.*, normally 3 – 4 dB. This requirement lowers the necessary measurement system noise floor still further.

While other antenna types could be used that have lower antenna factors or smaller sizes, these do not help the situation. Antennas with lower antenna factors are

larger, and the size increase forces the measurement to be made farther away (by the $D^2/(2\lambda)$ Rayleigh distance, which dominates at the upper frequency extreme). Smaller antennas have larger antenna factors, and cannot be moved any closer to the radiator (by the 3λ criterion for the near-field boundary).

In addition to the apparent measurement problems with the very low emission limit, it seems excessively restrictive to apply to indoor UWB devices (Section 15.517), the same low limit that is applied to vehicular radars (Section 15.515) and hand-held outdoor UWB devices (Section 15.519). Given the 9 dB building attenuation factor noted in paragraph 97 of the ***Report and Order*** and used subsequently in the analysis of GPS interference levels, it seems apparent that a slight increase in the emission limit for indoor systems will not create any interference to Government systems.

Kohler proposes that the Commission adopt the same limit that adopted with respect to the adjacent 1610 to 1990 MHz range, which is 12 dB lower than the general Part 15 limits. Raising the emission limit as proposed herein will allow indoor UWB devices to be reliably measured for compliance with the emission limits, while protecting existing services in this frequency range.

CONCLUSION

The Commission should raise the average radiated emission limit over the frequency range 960 to 1610 MHz from -75.3 dBm EIRP to -53.3 dBm EIRP. Without making a change to the limits adopted in the ***Report & Order***, it will not be practicable to

produce many of the types of consumer devices that the Commission has taken great pains to encourage.

Kohler once again congratulates the Commission on having taken a substantial step forward by adopting rules for UWB devices and continues to support the Commission's efforts in this regard.

Respectfully submitted,

KOHLER CO.

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